

## WEST Search History

DATE: Wednesday, September 18, 2002

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*DB=USPT,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ*

L2	L1 and fibre\$ or l1 and fiber\$	36	L2
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L1	(424/736)!.CCLS. or 424/732.ccls. or 424/766.ccls.	269	L1
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END OF SEARCH HISTORY

concentration in various culturing operations as a biotic medium. On evaporation of the carrots serum by pan methods a carrot syrup is obtained.

Brief Summary Text (17):

One of the inventors namely Dr Biyani had earlier developed a process for manufacture of low fat high fiber carrot granules, in which fat-content of disintegrated carrots is reduced by removing lipoid particles with the help of carboxylic acids and the remaining material is dried below 60.degree. C. to get the fibrous product in granular form [Indian Patent Application No 183668]. It has been found that during drying, carotenoids in the product degrade as a result of which carotenoids content in the dehydrated product is very low and it is unstable during storage.

Brief Summary Text (18):

To the best of our knowledge and information to date there is no report of any standardised carrot product containing therapeutically and nutritiously effective and useful optimal amounts of nutrients and fiber content.

Brief Summary Text (20):

An object of the invention is to provide a nutrients rich low fat high fiber carrot product.

Brief Summary Text (21):

Another object of the invention is to provide a nutrients rich low fat high fiber carrot product which is particularly rich in carotenoids and retains natural colour of carrot.

Brief Summary Text (22):

Another object of the invention is to provide a process for the preparation of a nutrients rich low fat high fiber carrot product.

Brief Summary Text (23):

Another object of the invention is to provide a process for the preparation of a nutrients rich low fat high fiber carrot product which is particularly rich in carotenoids and retains natural colour of carotenoids.

Brief Summary Text (24):

Another object of the invention is to provide a formulation of a nutrients rich low fat high fiber carrot product.

Brief Summary Text (25):

Another object of the invention is to provide a formulation of a nutrients rich low fat high fiber carrot product which is particularly rich in carotenoids and retains natural colour of carrot.

Brief Summary Text (26):

Another object of the invention is to provide a formulation of a nutrients rich low fat high fiber carrot product in the form of chewable granules, tablet, powder or diskettes/wafers.

Detailed Description Text (2):

According to the invention there is provided nutrients rich low fat, high fiber carrot product comprising 20-50% by weight of fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements.

Detailed Description Text (3):

Preferably the nutrients rich low fat high fiber carrot product comprises 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.

Detailed Description Text (5):

According to the invention there is also provided a process for the preparation of nutrients rich low fat high fiber carrot product comprising 20-50% by weight fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements, the process comprising crushing carrots, pressing the crush to separate pomace from juice, adjusting the pH of the juice to 3.0 to 6.0 with carboxylic acid in an amount of acid equivalent to 0.03 to 3% by weight of the juice, stabilising the juice with carbohydrate in amounts ranging from 1-10% by weight of the juice, separating the supernatant from the residual matter, concentrating the supernatant, blending the concentrate with the previously isolated pomace, drying the blend, pulverising or granulating the blend and sieving the powder or granules.

Detailed Description Text (6):

According to an embodiment of the invention the process comprises preparation of a carrot product comprising 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.

Detailed Description Text (12):

According to the invention there is also provided a formulation of a nutrients rich low fat, high fiber carrot product comprising 20-50% by weight fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements mixed with excipients.

Detailed Description Text (13):

Preferably the formulation of a nutrients rich low fat high fiber carrot product comprises 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble, and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.

Detailed Description Text (16):

According to the invention the carrot product or formulation of carrot product is standardised such that it contains therapeutically and nutritiously effective and useful optimal amounts of nutrients and fiber. Due to stabilisation with carbohydrates, the product is enriched with carotenoids and its colour is retained. It may be dispensed and consumed conveniently in small doses in healthcare and nutrition applications in the prevention and treatment of constipation, irritable bowel syndrome, obesity, diabetes, high cholesterol, cardiovascular diseases, cancer or eye diseases. It thus obviates the necessity of having to consume large quantities of fresh carrots for therapeutic and nutritional effects.

Detailed Description Text (19):

Fresh, hard, good quality reddish orange coloured carrots (*Daucus carota*) with a smooth surface were selected and washed thoroughly with water. The washed carrots (1.0 kg) were subjected to crushing in a crusher to provide a crush which was subjected to pressing through a filter press to provide pomace (380 grams) and liquid juice (ca. 600 ml). To the liquid juice, 1 g of adipic acid was added with stirring to adjust the pH to 4.0 followed by 10 g of sorbitol and it was subjected to centrifugation to provide a clear liquid extract (580 ml). The liquid extract was concentrated by vacuum distillation at 50-60.degree. C. to get a concentrate (about 100 ml) which was blended with the previously isolated pomace and dried at 50-60.degree. C. in a tray dryer under vacuum. The dried material was passed through a granulator and sieved through 20 mesh to obtain nutrients rich low fat high fiber carrot granules (95 g). The composition of the granules per 100 g was as given below:

Detailed Description Text (63):

One dose of 10 g of the granules of Example 1 followed by a glass of water was daily given to a first group of 18 obese persons (Group I) 15 minutes before each meal for a period of 2 months. Similarly one dose of 10 g of Isapgol powder followed by a glass of water was daily given to a second group of 18 obese persons (Group II) 15

minutes before each meal for a period of 2 months. The food served at each meal was the same and its consumption by each group was noted. It was observed that the amount of food consumed by the Group I gradually reduced. It was inferred that leisurely chewing of the granules gave a feeling of satiety and the water gave a feeling of fullness due to swelling of the fibre. As a result, the Group I was not able to consume the same quantity of food throughout the period of the experiment. Weight reduction of 2-3 Kg was observed in 15 persons of the Group I. Decreased consumption of food and reduction in weight did not result in weakness or fatigue of the concerned persons. It was inferred that this is due to the presence of nutrients in the granules. In the case of Group II, there was no significant reduction in consumption of food or in weight.

Detailed Description Paragraph Table (1):

Insoluble Fiber 25 g Soluble Fiber 7 g Total Fiber 32 g Carbohydrates 25 g Fat 0.67 g Proteins 7.5 g Carotenoids 87 mg Vitamin B1 1 mg Vitamin B2 0.02 mg Vitamin C 8 mg Calcium 1.46 g Magnesium 580 mg Iron 2 mg Manganese 1 mg Zinc 1 mg Potassium 2.99 g Sodium 1.79 g Phosphorus 277 mg Total Minerals (Ash value) 8.8 g

Detailed Description Paragraph Table (2):

Insoluble Fiber 20 g Soluble Fiber 13 g Total Fiber 33 g Carbohydrates 21 g Fat 0.7 g Proteins 6.9 g Carotenoids 92 mg Vitamin B1 0.7 mg Vitamin B2 0.03 mg Vitamin C 11 mg Calcium 0.6 g Magnesium 122 mg Iron 14 mg Manganese 0.5 mg Zinc 0.8 mg Potassium 1.1 g Sodium 1.59 g Phosphorus 416 mg Total Minerals (Ash value) 7.4 g

Detailed Description Paragraph Table (3):

Insoluble Fiber 15-40 g Soluble Fiber 5-10 g Total Fiber 20-50 g Carbohydrates 10-55 g Fat 0.1-1 g Proteins 4-9 mg Carotenoids 20-100 mg Vitamin B1 0.1-2 mg Vitamin B2 0.01-1 mg Vitamin C 2-1000 mg Calcium 0.3-2 g Magnesium 0.1-1 mg Iron 1-25 mg Manganese 0.1-1 g Zinc 0.1-2 mg Potassium 1-4 g Sodium 1-3 g Phosphorus 100-500 mg Total Minerals (Ash value) 5-10 g

US Reference Patent Number (9):

5304374

US Reference Patent Number (12):

6231866

US Reference Group (9):

5304374 19940400 Graves et al. 424/195.1

US Reference Group (12):

6231866 20010500 Mann 426/639

Other Reference Publication (4):

Fibre-Mediated Physiological Effects of Raw and Processed Carrots in Humans, Wisker et al., Br. J. Nutr., vol. 72, Oct. 1994, pp. 579-599 (abstract only).

Other Reference Publication (6):

Binding of Dietary Anions to Vegetable Fiber, Hoagland, J. Agric. Food Chem., vol. 35, 1989, pp. 316-319.

Other Reference Publication (8):

Cobinding of Bile Acids to Carrot Fiber, Hoagland et al., J. Agric. Food Chem., vol. 37, 1989, pp. 316-319.

Other Reference Publication (9):

Dietary Fiber Constituents of Selected Fruits and Vegetables, Ross et al., J. Am. Diet. Assoc., vol. 85, Sep. 1985, pp. 1111-1116 (abstract only).

Other Reference Publication (10):

Effects of Processing on the Dietary Fiber Content of Wheat Bran, Pureed Green Beans, and Carrots, Anderson et al., Journal of Food Science, vol. 45, 1980, pp. 1533-1534.

Other Reference Publication (12):

Colonic Response to Dietary Fibre from Carrot, Cabbage, Apple, Bran and Guar Gum, Cummings et al., The Lancet, vol. 1, Jan. 7, 1978, pp. 5-9.

CLAIMS:

1. A low fat, high fiber carrot product which is rich in nutrients comprising 20-50% by weight of fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements.
2. The low fat, high fiber carrot product which is rich in nutrients of claim 1 which comprises 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.
3. The low fat, high fiber carrot product which is rich in nutrients of claim 1, in which the vitamins are vitamin B2, vitamin C and/or niacin and carotenoids are beta-carotene and/or alpha-carotene and minerals and trace elements are iron, zinc, magnesium, potassium, sodium, phosphorus, manganese and/or calcium.
4. A process for preparing a low fat, high fiber carrot product which is rich in nutrients comprising 20-50% by weight fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements, the process comprising crushing carrots, pressing the crushed carrots to separate pomace from juice, adjusting the pH of the juice to a value of 3.0 to 6.0 with a carboxylic acid wherein the amount of acid is equivalent to 0.03 to 3% by weight of the juice, stabilizing the juice with a carbohydrate in an amount ranging from 1-10% by weight of the juice, separating residual matter from the juice to provide a clarified supernatant, concentrating the clarified supernatant to provide a concentrate, blending the concentrate with the previously isolated pomace to provide a blend, drying the blend, pulverizing or granulating the blend to provide granules, and sieving the granules.
5. A process as claimed in claim 4, which comprises preparation of a carrot product comprising 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.
18. A low fat, high fiber carrot product which is rich in nutrients comprising 20-50% by weight fiber of which 15-40% by weight is insoluble and 5-10% by weight is soluble, 0.1-1.0% by weight of fat, 10-55% by weight of carbohydrates, 0.02-1% by weight of carotenoids and vitamins and 5-10% by weight of minerals and trace elements mixed with excipients.
19. The low fat, high fiber carrot product which is rich in nutrients of claim 18 comprising 25 to 45% by weight of fiber of which 20 to 35% by weight is insoluble and 5 to 10% by weight is soluble, 0.3 to 0.7% by weight of fat, 20 to 40% by weight of carbohydrates, 0.1 to 0.5% by weight of carotenoids and vitamins and 6 to 8% by weight of minerals and trace elements.
20. The low fat, high fiber carrot product which is rich in nutrients of claim 18 which is in the form of chewable granules, powder or diskettes/wafers.
21. A process for preparing a low fat, high fiber carrot product which is rich in nutrients comprising: crushing carrots to provide crushed carrots; pressing the crushed carrots to separate pomace from juice; adjusting the pH of the juice to a value of 3.0 to 6.0 with a carboxylic acid; stabilising the juice with a carbohydrate; separating residual matter from the juice to provide a clarified supernatant; concentrating the clarified supernatant to provide a concentrate; blending the concentrate with the previously isolated pomace to provide a blend; drying the blend; and pulverizing or granulating the blend to provide granules.

22. A process for preparing a low fat, high fiber carrot product which is rich in nutrients comprising: crushing carrots to provide crushed carrots; pressing the crushed carrots to separate pomace from juice; adjusting the pH of the juice to a value of 3.0 to 6.0 with a carboxylic acid; separating residual matter from the juice to provide a clarified supernatant; concentrating the clarified supernatant to provide a concentrate; blending the concentrate with the previously isolated pomace to provide a blend; drying the blend; and pulverizing or granulating the blend to provide granules; the improvement comprising stabilizing the juice with a carbohydrate in an amount ranging from 1-10% by weight of the juice after the juice is acidified to provide a low fat, high fiber carrot product which is rich in nutrients having an elevated amount of carotenoids.

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L3: Entry 9 of 9

File: DWPI

Sep 24, 1998

DERWENT-ACC-NO: 1989-363887

DERWENT-WEEK: 199843

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TITLE: Granola bar with supplemental dietary fibre - prepd. by making compressed sized flakes of fibre and binder ingredients and mixing with granola ingredients

INVENTOR: LINSKOTT, S E

PATENT-ASSIGNEE: AMWAY CORP (AMWAN)

PRIORITY-DATA: 1988US-0207118 (June 15, 1988)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 2803844 B2	September 24, 1998		009	A23L001/308
US 4871557 A	October 3, 1989		007	
JP 02039870 A	February 8, 1990		000	

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 2803844B2	June 15, 1989	1989JP-0153554	
JP 2803844B2		JP 2039870	Previous Publ.
US 4871557A	June 15, 1988	1988US-0207118	
JP02039870A	June 15, 1989	1989JP-0153554	

INT-CL (IPC): A23G 3/00; A23L 1/10; A23L 1/308

ABSTRACTED-PUB-NO: US 4871557A

## BASIC-ABSTRACT:

New granula bars contain supplemental dietary fibre. The basic granula ingredients are grains, fruits and/or nuts. The supplemental dietary fibre is in the form of compressed flakes of mean particle size 100-5 U.S. mesh and at 5-20% of the bar.

Pref. the compressed flakes comprise at least one dietary fibre source and at least one binder. The fibre sources are apple fibre, com bran, soy fibre, pectin, guar gum, gun ghatti and gum arabic. The binders are rice flour, wheat flour, oat flour, corn flour, rye flour and potato flour. The flakes have particle size 60-10 (20) U.S. mesh. The mean particle size flakes:granular ingredients is 0.1-2:1 (0.5-1:1). USE/ADVANTAGE - The bars combine known snacks with the known advantages of dietary fibre e.g. bowel function normalisation, colonic disease reduction, treatment of diabetes, hypoglycaemia, hypercholesterolaemia and hypertriglyceridoemia and prevention of obesity.

ABSTRACTED-PUB-NO: US 4871557A

## EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: D13  
CPI-CODES: D01-B02C; D03-H01T;



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L6: Entry 3 of 11

File: USPT

Dec 19, 1995

DOCUMENT-IDENTIFIER: US 5476678 A

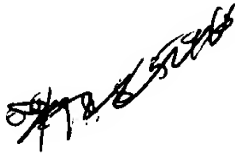
TITLE: Composition for and method of producing a fiber fortified chewy or soft-textured confection candy

Brief Summary Text (24):

Sources of insoluble dietary fiber include, but are not limited to, cereal brans, soy fiber, oat fiber, citrus fiber, corn bran, wheat bran, rice bran, barley bran, rye bran, triticales bran, psyllium seed fiber, cotton seed fiber, cellulose, apple fiber, pea fiber, sugar beet fiber and peanut fiber. In a preferred embodiment the insoluble fiber is chosen from cellulose and oat fiber.

Brief Summary Text (37):

Sources of insoluble dietary fiber include, but are not limited to, cereal brans, soy fiber, oat fiber, citrus fiber, corn bran, psyllium seed fiber, wheat bran, rice bran, barley bran, rye bran, triticales bran, cotton seed fiber, cellulose, apple fiber, pea fiber, sugar beet fiber and peanut fiber. In a preferred embodiment the insoluble fiber is chosen from the group consisting of cellulose and oat fiber.



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L6: Entry 7 of 11

File: USPT

Feb 4, 1992

DOCUMENT-IDENTIFIER: US 5085883 A

TITLE: Blend of dietary fiber for nutritional products

Brief Summary Text (10):

The properties of fibers (or fiber systems) most often related to physiological function are solubility and fermentability. With regard to solubility, fiber can be divided into soluble and insoluble components based on the fiber's capacity to be solubilized in a buffer solution at a defined pH. Fiber sources differ in the amount of soluble and insoluble fiber they contain. As used herein and in the claims "soluble" and "insoluble" dietary fiber is determined using American Association of Cereal Chemists (AACC) Method 32-07. As used herein and in the claims "total dietary fiber" or "dietary fiber" is understood to be the sum of the soluble and insoluble dietary fiber determined by AACC Method 32-07 and wherein by weight at least 70% of the fiber source comprises dietary fiber. As used herein and in the claims a "soluble" dietary fiber source is a fiber source in which at least 60% of the dietary fiber is soluble dietary fiber as determined by AACC Method 32-07, and an "insoluble" dietary fiber source is a fiber source in which at least 60% of the total dietary fiber is insoluble dietary fiber as determined by AACC Method 32-07. Examples of soluble dietary fiber sources are gum arabic, sodium carboxymethylcellulose, guar gum, citrus pectin, low and high methoxy pectin, barley glucans and psyllium. Examples of insoluble dietary fiber sources are oat hull fiber, pea hull fiber, soy fiber, beet fiber, cellulose, and corn bran.

contacting a dietary fiber component with a flavor component capable of being concentrated by lyophilization, the flavor component being absorbed into or adsorbed on the fiber, the dietary fiber component being additional to any dietary fiber present in the flavor component;

reducing the temperature of the combination of the dietary fiber and flavor component to a temperature immediately above the freezing point of the combination;

reducing pressure imposed on the combination to cause volumetric expansion of the combination;

maintaining the pressure on the combination at the reduced level while lowering the temperature of the combination to cause the combination to freeze; and,

subjecting the frozen combination to lyophilization to remove moisture therein to render the state of the product substantially solid when at normal environmental temperatures.

12. A method of making a substantially solid nutritional food product rich in dietary fiber and having improved organoleptic characteristics when consumed as a solid food product, comprising the steps of:

contacting a dietary fiber component with a flavor component capable of being concentrated by lyophilization, the flavor component being absorbed into or adsorbed on the fiber, the dietary fiber component being additional to any dietary fiber present in the flavor component;

freezing the combination of the dietary fiber component and flavor component; and,

subjecting the frozen combination to lyophilization to remove moisture therein to render the state of the product substantially solid when at normal environmental temperatures, the dietary fiber component being present in the lyophilized combination in a percentage by weight of at least fifty percent.

13. The method of claim 12, wherein the dietary fiber component is selected from the group consisting of an insoluble fiber, a soluble fiber and a combination thereof.

14. A method of making a substantially solid nutritional food product rich in dietary fiber and having improved organoleptic characteristics when consumed as a solid food product, comprising the steps of:

contacting a dietary fiber component with a flavor component capable of being concentrated by lyophilization, the flavor component being absorbed into or adsorbed on the fiber, the dietary fiber component being additional to any dietary fiber present in the flavor component, the dietary fiber component being present in the lyophilized combination in a percentage by weight of at least fifty percent;

freezing the combination of the dietary fiber component and flavor component; and,

subjecting the frozen combination to lyophilization to remove moisture therein to render the state of the product substantially solid when at normal environmental temperatures.

## End of Result Set



Generate Collection

L4: Entry 1 of 1

File: USPT

Apr 1, 1997

DOCUMENT-IDENTIFIER: US 5616355 A

TITLE: Lyophilized health food products and methods of making same

US PATENT NO. (1):5616355Abstract Text (1):

Food products and methods of making having a high dietary fiber content and unexpected organoleptic characteristics, the invention takes the form of a substantially solid or semi-solid substrate formed primarily of dietary fiber soaked in or permeated by a flavorful material such as a natural juice, liquefied or pureed fruit or the like, the combination then being at least partially lyophilized to a solid or semi-solid consistency. The concentration of the natural juice or other flavorful material within a framework or lattice provided by the dietary fiber causes a burst of flavor to be experienced when eaten. While the lyophilized substrate can preferably be consumed as a bar-like comestible with or without the addition of other materials such as coatings, fillers and the like, the invention contemplates the formation of the substrate as flakes, as a cookie, as a candy such as a semi-soft roll or sheet consumed flat or as a rolled sheet among other forms.

Brief Summary Text (3):

The invention relates to dietary fiber food products and particularly to such products having not only exceptionally high levels of dietary fiber but also exceptional organoleptic properties due to high flavor content from a natural juice or juices and the like which are concentrated in or on the fiber by lyophilization.

Brief Summary Text (5):

Dietary fiber has long been recognized as an essential part of the human diet, such fiber being generally defined as those portions of plant materials normally consumed in the diet and which are resistant to digestion by enzymes produced in human digestive processes. Dietary fiber is generally considered to comprise those polysaccharides, lignins, etc. which are not digested in human digestive processes. While fiber can be considered to substantially comprise insoluble fiber usually thought of as filament-like plant materials, the term "dietary fiber" also extends to materials which are soluble in water with such materials usually being gelatinous in nature. Presently accepted dietary standards call for consumption of dietary fiber including both insoluble fiber and soluble fiber.

Brief Summary Text (6):

Benefits considered to be realized through consumption of appropriate quantities of dietary fiber include regular and healthful function of the digestive system, reduction in diseases such as diseases of the colon, diabetes, hypoglycemia, hypercholesterolemia, hypertriglyceridemia, and the like. Dietary fiber also acts to control metabolic rates and as such can actually be used as a treatment rather than as a mere dietary element. Typical quantities of dietary fiber recommended for inclusion in the human diet range from 20 to 35 grams daily. Since the usual diet in the United States apparently provides only one-third to one-half of this recommended daily quantity of dietary fiber, substantial efforts have been made especially in the relatively recent past to fortify food products such as breads and breakfast cereals in order to yield a greater quantity of dietary fiber in the diet. Additionally, snack and convenience foods have been also modified in order to provide increased dietary fiber even to the extent that so-called "health" bars such as granola bars and the like have received substantial acceptance as health foods even though the fiber content of such foods is typically less than five percent by

weight. A typical granola bar weighing approximately one to two ounces usually provides less than one gram of dietary fiber. The addition of greater amounts of dietary fiber in health snacks such as granola bars and the like invariably impacts in a negative fashion the organoleptic qualities of the food product. Such food products having even minor amounts of increased dietary fiber in the form of supplements or additives result in a food product which is excessively dry and which has a taste and mouthfeel which is unacceptable. On the other hand, natural foods having relatively high levels of dietary fiber simply do not provide the desired quantities of dietary fiber in the diet due to the relatively low levels of such fiber in these natural foods and due also to the quantities of such foods which most individuals would normally consume in even a diet which is oriented toward health considerations. In spite of the large number of health food products now available to the consumer and which are purported to contain high levels of dietary fiber, a need still exists for a food product having high levels of dietary fiber and which also has a high level of taste acceptance. The present invention provides health food products capable of taking a number of forms and which exhibit extraordinarily high dietary fiber content and which have extraordinary taste appeal due to the concentration of naturally tasteful materials such as natural fruit juices and the like within a framework or matrix of dietary fiber, the consumer being enticed into increasing dietary fiber intake due to the exceptional taste of the food product itself.

Brief Summary Text (8):

The invention provides health food products and methods for making these products, the intent of the invention being to provide the present food products with an extraordinarily high proportion of dietary fiber while at the same time imparting to the food products unexpected taste qualities. The health food products of the invention can take a variety of forms and for this reason the basic form of the products will be referred to as a substrate or as a bar for the sake of convenience. The food products of the invention can assume a bar-like form of a size and weight similar to the "granola" bars or other fiber bars which are known in the art. The food products of the invention can further take the form of flakes, shaped substrates such as occur with cookies and the like, as candies including semi-soft rolls or as sheets which can be rolled into a candy-like food product. Particular substrates formed according to the invention can take the form of planar, sheet-like layers either formed together along planar surfaces or interspersed with layers of other food materials which differ in composition from the particular edible substrates of the invention. As an example, one or more sheet-like layers of edible materials comprised of lyophilized combinations of edible dietary fiber and natural juices, for example, can be disposed in desired locations within a granola bar or other fiber bar to add not only additional dietary fiber to such a bar, but also to add the characteristic burst of flavor of the present food products brought about by the concentration of the essences and organoleptic properties of the natural juices and similar materials permeated into the dietary fiber prior to lyophilization of the combination. In such a form, the present food products increase the fiber content and palatability of healthful food products such as granola bars and the like. As a further example, the substrates of the invention can take the form of flakes and the like such as are described by Linscott in U.S. Pat. No. 4,871,557, the disclosure of which is incorporated herein by reference, wherein the compressed flakes of supplemental dietary fiber of Linscott can be formed according to the present invention and added to a fiber bar such as a granola bar to add additional fiber to such a granola bar and to also increase the taste acceptability of same.

Brief Summary Text (9):

According to the invention, flavorful materials, particularly liquids such as natural juices and the like, are mixed with dietary fiber of either the soluble or insoluble type or a combination thereof, the flavorful liquid material being allowed to soak into, permeate and/or thoroughly mix with the dietary fiber prior to freezing of the combination with subsequent lyophilization of the combined material. The resulting product, regardless of physical shape, thickness, etc., contains a high percentage of dietary fiber and a high level of palatability especially in view of the high level of fiber in the food product. The taste of the present food products can best be referred to as a "burst of flavor" due to the fact that the lyophilization process acts to concentrate the flavorful principles contained within

the flavorful liquids including those essences and the like which appeal to the olfactory sense. Particularly desirable flavorful liquids include the natural juices although similar materials artificially formed can be used to produce acceptable products.

Brief Summary Text (10):

The dietary fiber and flavorful substrates of the invention can be produced with any soluble or insoluble fiber which would be considered suitable to the human diet and may include binders, fillers and the like including conventional diet food materials such as rolled oats, crisped rice, chopped nuts and the like which can be formed integrally with the present food substrates. Further, the present food substrates can be formed with coatings of dietarily acceptable materials such as chocolate or the like in order to increase palatability, ease of handling of the food product and packaging of the food product inter alia.

Brief Summary Text (11):

The lyophilization process or processes which can be employed according to the invention include those processes wherein the essences and flavorful constituents of the liquid materials, such as natural juices, forming a combination with the edible fiber is caused to have the basic solvent thereof removed therefrom, such basic solvent typically being water, so that the essences and flavorful constituents remain with the dietary fiber with minimum diminishment of the organoleptic effects thereof. The processes contemplated by the invention generally include a "freezing" of the combined fiber and liquid followed by the subjection of the frozen or substantially frozen combination to pressure sufficiently low to cause sublimation of the solvent material or materials. It should be understood that the freezing of the fiber and liquid combination can take the form of a densification of the combined materials to a desired consistency. Of particular note to the present methodology is that the natural solvent such as water within the materials sublimates from the "frozen" combination without substantial removal of essences and organoleptic constituents from the combination.

Brief Summary Text (12):

While a relatively dense product can be formed by the simple freezing of a flavor component and a fiber component followed by lyophilization, a less dense and somewhat expanded product can be obtained by producing a slurry of components according to the invention and reducing the temperature of the slurry to approximately 0.degree. C. followed by reducing pressure on the cold slurry to just below atmospheric, i.e., to about 28" of mercury, the pressure being applied while the slurry is then frozen. The process causes an expansion of the slurry during freezing to a less dense condition. Lyophilization then removes moisture to form a substantially dry product.

Brief Summary Text (13):

Accordingly, it is a primary object of the invention to provide healthful food products having unexpected organoleptic characteristics and formed primarily from dietary fiber with which a flavorful material such as a natural juice has been combined with the combination thereof being at least partially lyophilized to a consistency, preferably a solid consistency, for use as a food product or in a combination with other food products, thereby producing a food having high dietary fiber content with unexpectedly acceptable flavor.

Brief Summary Text (14):

It is another object of the invention to provide health food products in lyophilized form which can be consumed as a bar-like comestible with or without the addition of other materials such as coatings, fillers and the like and which has an unexpectedly high proportion of dietary fiber coupled with unexpected taste qualities.

Brief Summary Text (15):

It is a further object of the invention to provide food products having a lyophilized substrate which can take a variety of shapes such as flakes, bars, sheets, rolled sheets, semi-soft rolls and the like which either solely or in combination with other dietary materials form high fiber food products having unexpectedly high palatability.

Detailed Description Text (2):

The invention provides food products having high dietary fiber content and unexpected organoleptic characteristics, these food products being capable of taking a variety of forms in a variety of products. For various reasons including the disclosure of various types of soluble and insoluble dietary fiber, the disclosure of various materials utilized in the formation of granola bars, that is, high dietary fiber "health" bars and the like including coatings, fillers, binders and the like, as well as the disclosure of forms of supplemental dietary fiber which can be formed according to the invention, the disclosure of U.S. Pat. No. 4,871,557 to Linscott is incorporated hereinto by reference.

Detailed Description Text (3):

One preferred embodiment of the invention takes the simple form of a bran bar having the shape of a rectangular solid in much the same fashion that a granola bar or health food bar takes a similar shape. Such a bar is conveniently formed of a bran material such as wheat or oat bran but it is to be understood that any edible fiber or dietary fiber can be utilized in this embodiment of the invention. The fiber or fibers chosen are admixed with natural juices including orange juice, apple juice, grapefruit juice and the like with the fiber being soaked in the juice for a period of time necessary to absorb the juice into the fibers. The bran and juice may be combined in an aqueous suspension in order to produce absorption by the fibers or permeation of the juice into the fibers. The combination so produced is then formed into a bar shape unless the fiber is formed into a bar prior to soaking by the juice and the bar is frozen and subsequently lyophilized to form a health food bar which can be consumed as is. It should be understood that the combined fiber and juice could be frozen and then lyophilized without formation into a bar or other desirable shape. In such a situation, the material of the invention produced by the lyophilization process can then be formed into a desired shape such as the shape of a bar.

Detailed Description Text (6):

On contact between the food product of the invention and the saliva of a consumer, the consumer experiences an immediate burst of flavor which is intense. The flavorful food products of the invention not only provide an intensely flavorful food but also an extremely healthful natural food due to the high percentage of dietary fiber present in the food and due to the nutritional content of the juice material which is contained therein. With only a single health food bar prepared according to the invention, a large percentage of an individual's daily fiber requirements can be provided and with a food product which is intensely flavorful and therefore readily and pleasurably consumed by the individual. Previous health food bars contain only a small proportion of dietary fiber in each bar and usually suffer a decrease in organoleptic quality when the fiber content is over only a few percent. As is noted in U.S. Pat. No. 4,871,557 to Linscott, mentioned previously, granola bars and the like having only a relatively small proportion of fiber must mix a variety of sugars and high calorie, usually sweet, materials into the granola bar in order to form a product having any degree of acceptable taste and mouthfeel.

Detailed Description Text (7):

According to the invention, a desirable ratio by weight of dietary fiber to natural juice in the bar thus described is approximately 20% or less fiber with 80% or more juice by weight. However, after the lyophilization process, a large proportion of the water is removed from the combination with the fiber then constituting a high proportion of the bulk of the resulting food product.

Detailed Description Text (8):

It is to be understood that the food product of the invention can be formed in a variety of shapes and with an extraordinarily wide variety of fiber and "juice" materials. In fact, the "juice" material need not be selected only from the group of natural juices such as fruit juices, but can also take the form of vegetable juices and juice-like materials which need not be of natural origin but which can be otherwise manufactured. Normally solid materials having flavorful qualities can be constituted in aqueous solution as can be the natural fruit and/or vegetable juices inter alia for soaking into the fiber as well as for being laid down on the fiber in situations where the flavorful material does not soak into the matrix or lattice provided by the dietary fiber. Thus, the liquefied fruits and the like as well as

pureed fruits and the like may be used as the "juice" material, i.e., the flavorful component.

Detailed Description Text (9):

The flavorful component of the invention which is preferably chosen from natural fruit and vegetable juices can take the form of natural or artificial materials. The various materials useful according to the invention may be mixed with water to form an aqueous suspension or solution in which the fiber is soaked. Combinations of these flavorful materials can be mixed together to form this component of the combination which is to be absorbed by the fibers or taken onto the fibers, it typically being preferred that this component take the form during the combining process of a liquid in order to facilitate absorption or the like. Typically juices such as orange juice, apple juice, grapefruit juice, various citrus juices and fruit juices of virtually any description can be employed along with vegetable juices, artificial juices or flavors such as natural vanilla flavor, coconut flavor, natural butter flavor and the like, with the imagination of the practitioner being the only limit to the nature of the material employed.

Detailed Description Text (10):

The dietary fiber can take the form of natural plant fibers including wheat bran, oat bran, soy fiber, apple fiber, corn bran, barley bran, rye bran, triticale bran, cellulose, pea fiber, sugar beet fiber, peanut fiber and the like, these materials generally being referred to as insoluble fibers. Such insoluble fibers can be utilized alone according to the invention or can be formed with soluble fibers which include, but are not limited to, gum arabic, gum ghatti, guar gum, pectins, psyllium, carrageenans, xanthan, tragacanth, caraya, locust bean gum, agar and alginates. Suitable food binders can also be employed which include rice flour, wheat flour, oat flour, corn flour, rye flour, potato flour, and mixtures thereof to name but a few. It is to be understood that the invention can be practiced without the use of binders. It is also to be understood that the dietary fiber component of the invention preferably comprises more than 50% of the fiber as insoluble fiber, but is not so limited.

Detailed Description Text (11):

Either before or after admixture of the dietary fiber component of the invention with the flavorful component, various food materials typically a part of health food product can be added to the combination which is then lyophilized, such materials including rolled oats, chopped nuts, crisped rice, coconut and the like. These food materials can be present during the lyophilization process. As an alternative, such food materials can be added after the lyophilization process prior to a forming step. Reference is made to U.S. Pat. No. 4,871,557, the disclosure of which is incorporated by reference, for a listing of various other materials which can be added to the food product of the invention depending upon the resulting product which is desired.

Detailed Description Text (14):

The combined fiber component/flavor component material after lyophilization can be formed into flakes or even a flour-like consistency for addition to other foods and particularly foods incapable of transferring moisture to the health food products of the invention.

Detailed Description Text (15):

The lyophilization process intended for use in the invention can be taken to be any such process wherein a solvent such as water is sublimed from the frozen combination. In a usual process, the frozen fiber component/flavor component combination is maintained at a temperature of between -25.degree. C. and -50.degree. C. under a pressure of approximately 0.1 to 1.0 mm Hg. It is to be understood that freeze drying processes can occur in other temperature ranges and at other pressure levels and that the invention contemplates the use of temperatures and reduced pressures which are effective to accomplish the objects of the invention. Of primary importance according to the teachings of the invention is the concentration of the aromatic, nutritional and flavorful constituents of the flavor component such as a natural juice within the fiber or on the fiber, the lyophilization process acting to concentrate these constituents due to the sublimation of water from the frozen flavor material.



Detailed Description Text (16):

The percentage of the dietary fiber component utilized to form the combination of the fiber soaked with the flavor component such as a natural fruit juice can take a widely varying range. While as much as 20% fiber by weight can be admixed with 80% or more aqueous juice by weight, greater percentages of fiber can be employed up to at least 60% of fiber while retaining acceptable organoleptic properties in a finished product. By the same token, less fiber can be employed down to only a few percent, the critical factor being that a sufficient amount of fiber is present to absorb or adsorb the flavor component prior to lyophilization. When using both soluble and insoluble fiber, the proportion of insoluble fiber to soluble fiber may vary according to taste and processibility.

Detailed Description Text (17):

In another typical formulation, the fiber component can be a mixture of approximately 20% wheat bran and 80% oat bran. This fiber component may then constitute approximately 20% of the pre-lyophilized mixture with approximately 80% thereof constituting 35% orange juice and 45% water. Desirable substitutes and/or additions include citrus fiber in the fiber component and apple or mango juices or purees in the flavorful material.

Detailed Description Text (18):

In yet another formulation, a mixture of 3.25 grams of insoluble wheat bran is admixed with 20.15 grams of soluble oat bran. Banana puree and orange juice concentrates are added in amounts of 5.2 grams and 46.8 grams respectively. A quantity of 54.6 grams of water is then added and the mixture is allowed to stand to complete the "soaking" or agglomeration process. After forming into a desired shape, the material is frozen and lyophilized. The initial 130 grams of material lyophilizes to 43.3 grams with approximately 23.3 grams constituting the fiber component and the balance constituting the flavorful component.

Detailed Description Text (19):

The combinations of one or more flavorful components and one or more fiber materials as described above are typically blended to a slurry consistency prior to freezing in the method of the invention previously described. That methodology produces a relatively dense product. A second method according to the invention produces a less dense product which is "expanded" essentially during a freezing step with the frozen combination then being freeze dried in essentially the same manner as occurs according to the method or methods previously described. Any of the combinations previously described can be used in this second processing method, it being desirable to form the compositions into a slurry prior to freezing. The temperature of the slurry is then taken to approximately 0.degree. C. or that temperature which is just above the freezing point of the slurry. The temperature of the slurry can then be held at this temperature or the temperature can continue to be lowered while a vacuum of approximately 28" mercury is applied and held constant over the slurry until the average product temperature reaches approximately -10.degree. C. or lower if a lower temperature is necessary to freeze the slurry. When the relatively low pressure is applied to the cold slurry, the slurry "expands" or becomes less dense via an expansion produced by the relatively low pressure imposed upon the slurry. The slurry is thus frozen and "locked" into this "suspended" or expanded state while the frozen slurry is then subjected to a lyophilization process as is described herein. The frozen, expanded slurry resists collapse while lyophilization proceeds. In most situations, the slurry expands to approximately twice its original mass although the pressure level can be adjusted to cause expansion of other degrees, a lower pressure generally causing a greater expansion. The expansion of the slurry acts to increase sublimation and to substantially reduce drying time.

Detailed Description Text (20):

A combination of slurried fruit, bran fiber and water weighing approximately 51 grams will result in a dry product weight of approximately 24.5 grams in a finished product processed according to this second method, the method allowing retention of organoleptic properties including mouthfeel and the characteristic burst of flavor of the products according to the invention while producing a less dense product having desirable uses either as is or in combinations with other food materials. The slurry used in this second method should have a firm consistency and be taken to a

first temperature before expansion which is consistent throughout the slurry. In such a situation, the slurry will spontaneously freeze when the pressure is lowered to 28 to 30" of mercury.

Detailed Description Text (21):

Generally, the products of the invention can be produced in molds to yield a desired shape. When produced as a bulk item which is then added to other food materials, the shape of the lyophilized product is immaterial when the product is to be reduced to granules, powders, etc. According to usual practice of the invention, approximately 1/3 bran as the fiber component and 2/3 fruit juice/water as the flavorful component produce desirable food products.

CLAIMS:

1. A method of making a substantially solid nutritional food product rich in dietary fiber and having improved organoleptic characteristics when consumed as a solid food product, consisting of the steps of:

contacting a dietary fiber component with a flavor component capable of being concentrated by lyophilization, the flavor component being absorbed into or adsorbed on the fiber, the dietary fiber component being additional to any dietary fiber present in the flavor component;

reducing the temperature of the combination of the dietary fiber and flavor component to a temperature immediately above the freezing point of the combination;

reducing pressure imposed on the combination to cause volumetric expansion of the combination;

maintaining the pressure on the combination at the reduced level while lowering the temperature of the combination to cause the combination to freeze; and,

subjecting the frozen combination to lyophilization to remove moisture therein to render the state of the product substantially solid when at normal environmental temperatures.

3. The method of claim 1 wherein the dietary fiber component is present in the lyophilized combination in a percentage by weight of at least fifty percent.

4. The method of claim 1 wherein the dietary fiber component is selected from the group consisting of an insoluble fiber, a soluble fiber and a combination thereof.

5. The method of claim 4 wherein the dietary fiber component is present in the lyophilized combination in a percentage by weight of at least fifty percent.

6. The method of claim 1 wherein the dietary fiber component is selected from the group consisting of vegetable brans, fruit fibers and combinations thereof.

7. The method of claim 6 wherein the dietary fiber component is present in the lyophilized combination in a percentage by weight of at least fifty percent.

8. The method of claim 1 wherein the flavor component is selected from the group consisting of natural and artificial fruit juices, natural and artificial vegetable juices, natural plant extracts, artificial flavors and flavorful materials capable of concentration by lyophilization and the dietary fiber component is selected from the group consisting of an insoluble fiber, a soluble fiber and a combination thereof.

9. The method of claim 8 wherein the dietary fiber component is present in the lyophilized combination in a percentage by weight of at least fifty percent.

11. A substantially solid nutritional food product rich in dietary fiber and having improved organoleptic characteristics when consumed as a solid food product, the product being prepared by a process consisting of the steps of:

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☐ 1. 6361818. 05 Dec 00; 26 Mar 02. Nutrient rich, low fat, high fiber, carrot product, and process of making. Biyani; Milind Kesharlal, et al. 426/640; 426/489 426/492 426/518 426/639. A23L001/212.

☐ 2. WO 200044235 A2 GB 2362799 B AU 200044290 A ZA 200004266 A US 20010012534 A1 GB 2362799 A US 6361818 B1. Carrot product or formulation useful in health care and nutrition applications e.g. for treating constipation, comprises fiber, fat, carbohydrates, carotenoids and vitamins. BANAVALIKER, M M, et al. A23B000/00 A23L000/00 A23L001/212 A23L001/308 A23L002/02 A61K035/78.

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## Fiber - Friend or Foe?

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## Introduction

Dietary fiber, formerly unrecognized for its health benefits, has received much attention in the past few years. It is widely accepted as playing a significant role in reducing total blood cholesterol, thereby decreasing the risk of coronary heart disease. It has also been credited in helping to alleviate numerous bowel problems, including colon cancer. Are these two hypotheses true?

## Basics of Dietary Fiber

Dietary fiber can be divided into two basic groups, soluble and insoluble. Soluble fiber dissolves in water, and insoluble fiber, as the term describes, does not. Both soluble and insoluble fiber provide bulk to the large intestine and encourage bowel regularity. However, there are important differences between the two.

### **Soluble Fiber:**

**The job of soluble fiber is to absorb water in the intestinal tract and slow down amount of time needed to empty the intestine. Eating these fibers makes you full and may help in weight loss.** These are also the fibers which are credited with helping to lower cholesterol levels in the blood. Examples of foods that contain soluble fibers include:

- Dried beans and peas.
- Lentils.
- Oats.
- Barley.
- Psyllium laxatives
- Sesame seed
- Fruit, especially bananas, apple pulp, citrus, grapes, apricots, cherries
- Vegetables, especially potatoes, cabbage, carrots



**Remember that fruits and oats are primary sources of soluble fibers. Psyllium is the most convenient and readily available form of soluble fiber supplementation.**

### ***Insoluble Fiber:***

**Insoluble fibers draw water into the intestinal tract, but rather than slowing down digestion, they actually speed it up and increase the amount and frequency of movements.** Examples of foods that contain insoluble fibers:

- Wheat bran
- Apple and pear skins
- Peas and carrots
- Bran cereals
- Whole-grain breads
- Vegetables.
- Pears
- Toasted whole-grain breads
- Browned potatoes

<http://www.bawarchi.com/tips/>.

Lemon and orange peels, **dried** and powdered and mixed with gram flour can be used as an excellent exfoliant. When required add 1 tsp. curds to 1 tbsp. flour mixture. Rub face gently with mixture for 5 minutes, wash with ordinary tap water for a clean, clean, feel. This can also be used as a bath scrub for body, daily.

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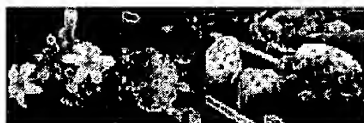
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## Fiber

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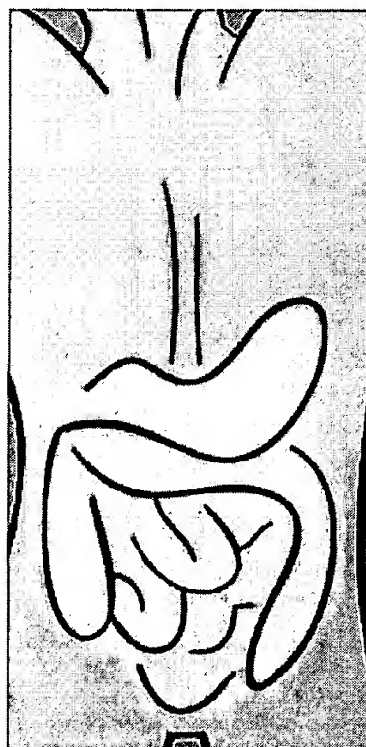
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### Facts

. Fiber is any part of a plant food that the body is unable to digest, i.e. that the digestive enzymes are unable to break it down.

. Dietary fiber is made up of complex carbohydrates & substances which form the plant cell walls & structure. Complex carbohydrates from plants are rich in starches & fiber.



**Words from 'The Fibre Man' (con't)**

"All the diseases I have mentioned, without exception, are related directly or indirectly with the alimentary tract. And the

. Dietary fiber is classified into two types as soluble fiber or insoluble fiber depending on the solubility in water & other factors involved:

- Soluble fiber can reduce cholesterol levels because it binds with bile (which is made up of cholesterol) in the intestines which is released out of the body. It also delays the time taken for digested food to move through the intestines (e.g. slows down the digestion of carbohydrates like sugars, which results in better glucose tolerance)

- Insoluble fiber speeds up the process of food travelling through the intestines. This prevents the exposure of harmful toxins from overstaying in the colon. It absorbs water in the colon which results in softer & larger stools.

. Fiber makes stools more acidic which encourages less bacteria degradation & thus reduce the production of toxic/carcinogens in the intestine.

. Fiber adds volume & softens stools. Fiber boosts regular bowel movements.

. A low fiber diet has been linked to constipation, haemorrhoids (piles), diabetes, heart disease, irritable bowel syndrome, obesity & autoimmune disorders.

### Types of fiber

. Cellulose - the main substance that make up plant cell walls. Found in all fruits, legumes & vegetables.

. Hemicelluloses - the main structural fiber in cereals.

environment of your gut and mine is determined by the food we eat."

"One of the first to recognize a relationship between refined carbohydrate foods & disease was Dr. T. R. Allinson who, in an essay written nearly a century ago, related not only constipation but also piles (haemorrhoids) & varicose veins to an insufficiency of fibre in the diet. Sir Robert MacCarrison, early in the 1900s, warned of the dangers of over-processed food."

\* Born in 1911 in Ireland, Dr. Burkitt while serving as a surgeon in Africa in the '50s & '60s, discovered a type of lymphatic cancer in children, which is known as Burkitt's lymphoma. He also found that a serious lack of fiber in the typical Western diet was to blame for many diseases such as colon cancer, diabetes & heart disease - rarely found in African populations, where diets are rich in fiber.

Find out more about what Dr. Burkitt said on -  
Constipation  
Varicose veins

Books & articles



- . Pectin - forms a gel when mixed with water. Found in apples, citrus fruits & vegetables.
- . Lignin - the only non-carbohydrate fiber. Found in fruit seeds (e.g. kiwi, strawberries & raspberries) or in the woody parts of vegetables (e.g. carrots).
- . Gum - the viscous & sticky water-soluble substance extracted from seeds of the guar plant.
- . Mucilages - gummy substance exuded by plants. Used as food stabilizers.
- . Arabinogalactans - dissolves in water but does not turn viscous. Found in fruits, vegetables & in the wood of the larch tree.

#### Fibrous food

- . Soluble fiber (pectins, some hemicellulose, gums, mucilages & arabinogalactans) :
  1. Whole grains : barley, oat bran
  2. Fruits : apple, banana, citrus fruits (e.g. orange, grapefruit), fig, papaya, pear, pineapple, tomato
  3. Vegetables : carrots, glucomannan (derived from konjac root), zucchini
  4. Legumes : lentils, peas, soy beans
  5. Seeds : psyllium
- . Insoluble fiber (cellulose, hemicelluloses & lignins) :
  1. Whole grains : amaranth,

Burkitt Cancer Fiber by Ethel R. Nelson. Technical Services, 1998.

Western Diseases, Their Emergence and Prevention by H. C. Trowell & Denis P. Burkitt. Harvard University Press, 1981.

Dietary Fibre, Fibre-Depleted Foods and Disease by Denis Burkitt. Academic Press, 1997.

Fiber Man: The Life Story of Dr Denis Burkitt by Brian Kellock. Lion Publishing, 1985.

Heinerman's Encyclopedia of Healing Juices by John Heinerman. Prentice Hall, 1994.

Healthy Habits: 20 Simple Ways to Improve Your Health by David & Anne Frähm. John P. Tarcher, 1998.

The Healthy Liver & Bowel Book by Dr. Sandra Cabot. Celestial Arts, 1999.

Nutritionally Incorrect: Why the American Diet is Dangerous & How to Defend Yourself by Dr. Allan N. Spreen. Woodland Publishing, 1999.

Fast Food Nation : The Dark Side of the All-American Meal by Eric Schlosser. HarperCollins, 2002

brown rice, buckwheat, oat bran, oatmeal, rye, teff, whole-wheat flour, whole wheat bread, wild rice

2. Fruits : apple, blackberries, blueberries, raspberries, fig

3. Vegetables : asparagus, broccoli, brussels sprouts, cabbage, cauliflower, celery, cucumber, flaxseed, lettuce, root vegetables (e.g. carrots, beetroots, potato with skin), tomato

Note: best eaten raw or slightly cooked

4. Nuts : raw almonds  
Note: Avoid deep-fried or salted varieties. Since nuts are pretty high in calories, consume in moderation.

5. Seeds : psyllium

. Both soluble & insoluble :

1. Fruits : apple, blackberries, blueberries, raspberries, fig

. Drink lots of fluid (e.g. juice, broth, water) when increasing fiber intake. Increase intake gradually; add a little each day.

. Processed food contains little or no fiber at all.

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## Fiber & gas

. A high-fiber diet causes the intestinal bacteria to produce gas as a result of digesting fiber.

## Fiber supplement

. Research has shown that

Win the Sugar War : 120 Real-Life Stories of Conquering Cravings--And Pounds by Holly McCord. Rodale Press, 2002.

Sugarfree New Orleans : A Cookbook Based on the Glycemic Index by Deanie Comeaux Bahan. Afm Pub Ltd, 1997.

Stevia Sweet Recipes : Sugar-Free-Naturally by Jeffrey Goettemoeller. Vital Health Publ, 1999.

The Fat Flush Plan by Ann Louise Gittleman. McGraw Hill College Div, 2001.

Carbohydrate-Addicted Kids : Help Your Child or Teen Break Free of Junk Food and Sugar Cravings-For Life! by Rachael & Richard Heller. HarperCollins, 1998.

Soy Source by John Downes. Avery, 2000.

Are apples really good for you?

More fiber, later periods

Glucomannan for weight loss

Fibrous place

Psyllium seeds

Apple peeling

supplementing a single dose of 20g insoluble fiber can prevent the absorption of essential minerals such as calcium, iron & zinc, whereas consuming 20g to 35g of natural fiber found in foods does not affect mineral absorption. So get fiber from foods & not from supplements alone.

Folks with difficulty in swallowing should not take fiber supplements as they can expand in the throat & pose serious consequences.

### Fiber & weight loss

. High-fiber food takes a longer time to chew & thorough chewing soothes hunger pangs.

. Since fiber provides bulk or roughage, it makes one feel full & thus curbs the urge to eat more. Also soluble fiber absorbs water & slows down the digestive process which makes one feel full - longer.

### Words from 'The Fibre Man'

Hear these words of caution from Dr. Denis Burkitt \* as found in Brian Kellock's book 'The Fibre Man' (Lion Publishing plc, 1985) :

"If you put fibre into a glass of water, what happens? It absorbs water & swells. In the gut fibre will hold the water partly by mechanical attraction & partly by providing food for the bacteria which are 80 per cent water anyway. So fibre ensures the presence of a large soft, asymmetrical mass. It is strongly protective against constipation, & by this & other means provides

### Glucomannan

### Barley grass

### Oat bran

### TAHITIAN NONI™ Fiber Complex

(The Products/General Nutrition)

A host of fibers including psyllium husk, soy fiber & chicory root fiber.

### TAHITIAN NONI™ Hoa Complete

(The Products/General Nutrition)

Contains noni Morinda citrifolia, barley, broccoli, apple pectin, 13 vitamins, 12 essential minerals & over 40 antioxidant herbs.

Digestive Enzyme Complex Full spectrum of plant-based enzymes to improve digestion & relieve the discomfort of indigestion.

### Super Detox Program

A total detoxification program that includes scrubbing the intestines free of old fecal matter, decaying food remnants, dead microorganisms, toxins & etc. Helps kill parasites, unfriendly bacteria & yeast.

### Fiber combinations

### Assorted digestive aids

### Grain food

protection against many diseases of the gut."

"Fibre in the diet makes the stool more acid. As a result there is less bacterial degradation of the normal bowel constituents into potential carcinogens (cancer-producing substances), so fibre probably reduces the carcinogens in your gut and mine. Also fibre increases the mass of the stool, so any carcinogens contained in it are beneficially diluted. In addition, intestinal transit time is shortened, so contact between carcinogens and the bowel lining is also shortened."

"Diverticular disease is a disease of Western culture, almost unknown in the third world. Even in a relatively advanced city like New Delhi, where I visited an enormous university X-ray department, I found they had seen only eight cases of diverticular disease in thirteen years. In Britain it is estimated that it is present in one in three adults over sixty."

"Gall-stones is a disease of modern Western culture. It is estimated that a third of a million gall-bladders are removed annually in America. More is spent in the United States on taking out gall-stones than the total expenditure on preventive & curative health care in the whole continent of Africa. Yet it is largely a preventable disease."

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# Dietary Fiber

Family and Consumer Sciences

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## What Is Dietary Fiber?

Dietary fiber is the part of whole grains, fruits, vegetables, beans, nuts, and seeds that we cannot digest. Dietary fiber is not a single substance, but a group of substances with similar properties. Some of the components of fiber are cellulose, hemicellulose, lignin, gum, and pectin.

## Two Types of Dietary Fiber

Dietary fiber can be separated into two basic types based on its properties and effects on the body. These two types are insoluble and soluble fiber.

**Insoluble fibers**, such as cellulose, hemicellulose, and lignin, do not dissolve in water. Insoluble fibers are found in foods such as wheat bran, whole grains, and vegetables. Insoluble fibers absorb water and increase the intestinal bulk, which helps the intestine function properly.

**Soluble fibers**, such as gum and pectin, dissolve in water and are found in beans, oats, barley, and some fruits and vegetables. Soluble fibers may play a role in lowering blood cholesterol and in regulating the body's use of sugar.

## What Foods Supply Fiber?

Plant foods are the only source of dietary fiber. The best sources of fiber are whole grain breads and cereals, fruits and vegetables, and dried beans and peas. These foods provide both soluble and insoluble fibers.

Food Sources of Insoluble Fiber		
<i>Cellulose</i>	<i>Hemicellulose</i>	<i>Lignin</i>
Whole Wheat Flour Unprocessed Bran Cabbage Peas Green Beans Wax Beans Broccoli Brussel Sprouts Cucumber with Skin Green Peppers Apples Carrots	Bran Cereals Whole Grains Brussels Sprouts Mustard Greens Beet Root	Bran Cereals Unprocessed Bran Strawberries Eggplant Pears Green Beans Radishes

Food Sources of Soluble Fiber	
<i>Gum</i>	<i>Pectin</i>
Oatmeal	Squash
Rolled Oat Products	Apples
Dried Beans	Citrus Fruits
Cauliflower	
Green Beans	
Cabbage	
Dried Peas	
Carrots	
Potatoes	
Strawberries	

### What Does Dietary Fiber Do?

Dietary fiber has important benefits in nutrition and health. Dietary fiber has preventive health benefits for many conditions, including diverticular disease, colon cancer, heart disease, and diabetes.

#### Digestive System

Dietary fiber has health benefits through its effect on the digestive system. A high-fiber diet helps relieve constipation. Both types of fiber play important roles in the digestive tract. Insoluble fiber draws water from the system and increases the bulk and softness of the food mass in the intestine. This decreases the time it takes to travel through the digestive system, making elimination easier. Soluble fiber seems to delay the digestion and absorption of nutrients and alters the action of digestive enzymes and hormones.

#### Diverticular Disease

Diverticular disease is characterized by protrusions or out-pouches in the wall of the colon. These pouches, or diverticula, are believed to develop from excessive pressure, which weakens the wall of the colon. As much as one-third of the U.S. adult population has diverticula. In many cases, there are no obvious symptoms but in some people the diverticula become inflamed and painful. High-fiber foods may help in the prevention of diverticular disease by making a larger softer stool that requires less pressure to pass through the digestive system.

### Colon Cancer

High-fat intake has been correlated to the incidence of colon cancer. A high fiber, low-fat diet may reduce the risk of colon cancer in several ways. First, fiber absorbs water, lowering the concentration of potential carcinogenic (cancer causing) substances in the intestine. Second, since insoluble fiber speeds up the movement of waste material in the intestine, the colon is exposed to any cancer causing substance in the intestine for a shorter length of time. Finally, diets high in fiber are typically lower in fat and may help protect against colon cancer by reducing fat intake.

### Heart Disease

Soluble fiber may have a role in reducing heart disease risk by lowering blood cholesterol concentration in some people. As it passes through the intestine, soluble fiber binds to dietary cholesterol, helping the body to eliminate it. There is also some evidence that soluble fiber can slow the liver's production of cholesterol, as well as alter low-density lipoprotein particles to make them less of a health risk. A high-fiber diet, combined with a low-fat diet, can be an effective approach to reducing the risk of heart disease.

### Diabetes

Diabetes is a condition characterized by high blood sugar levels. Dietary fiber has a favorable effect on blood glucose (blood sugar). Soluble fiber delays digestion and absorption of glucose into the blood, which may help prevent wide swings in blood glucose throughout the day.

### Are You Getting Enough Fiber?

The average American consumes between 10 and 15 grams of fiber per day. The National Cancer Institute recommends we consume between 20 and 30 grams per day from a variety of foods. You can increase dietary fiber in your diet from whole grain breads and cereal. Other good fiber sources are fresh fruits and vegetables with peels, dried beans, and peas.

### Fiber on Food Labels

The amount of dietary fiber in a serving of food is listed in grams and as a percent of the Daily Value on the nutrition label. The Percent Daily Value for dietary fiber shows how much fiber a serving contributes to a 2,000

calorie reference diet. The manufacturer may also list the amount of insoluble fiber and soluble fiber.

### Claims that Can Be Made on Food Packages About Dietary Fiber

<b>Dietary Fiber Claims that Can Be Listed on the Food Label</b>	
Good Source of Fiber, Contains Fiber, Provides Fiber	3 to less than 5 grams of fiber (10 to 19 percent of the fiber Daily Value)
High Fiber, Rich in Fiber, Excellent Source of Fiber	5 grams or more fiber (20 percent or more of the fiber Daily Value)
Other	Any product making a fiber claim must qualify for a "goodsource" or "high" claim and must state the level of total fat per serving if the food is not "low fat" (3 grams or less fat).

In 1993 a health claim regarding fiber was approved by FDA which allowed the statement that diets low in fat and rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer. The most recent claim approved by FDA in 1997, allows the statement that foods with soluble fiber from whole oats may reduce heart disease risk when eaten as a part of a diet low in saturated fat and cholesterol.

### Healthy Choices for Increasing Fiber Through the Food Guide Pyramid

#### Bread, Cereal, Rice, and Pasta Group

- To increase the fiber content in breads, look for whole-grain breads with "whole wheat flour," "stone-ground whole wheat flour" or "100 percent whole wheat flour" as the first ingredient.
- To increase the fiber content in cereals, look for "whole-grain wheat," "whole-grain oats" or "whole-grain rice" as the first ingredient.

- Brown rice is higher in fiber than refined white rice.
- Experiment with different grains such as couscous, barley, bulgur, quinoa, and kasha in salads, soups, and casseroles to increase fiber.

#### Fruit and Vegetable Groups

- Fruits are naturally high in fiber. Fresh fruits are higher in fiber than frozen or canned. Peels and seeds in fruits increase fiber.
- Vegetables are also naturally high in fiber. To keep the fiber content of vegetables high, try eating them raw or steam just until tender. Leaving the skins on vegetables can also increase fiber.
- Add dried fruits to cereal, muffins, and quick breads to increase fiber.

#### Meat, Poultry, Fish, Dry Beans, Eggs, and Nut Group

- Dried beans and peas are low in fat and an excellent source of fiber, vitamins, and minerals. Add beans, peas and lentils to soups, stews, salads, and rice dishes.
- Nuts are a good source of fiber but are also high in fat.

#### Fiber Supplements

You can get enough dietary fiber without using fiber supplements by following the Food Guide Pyramid recommendations. The Food Guide Pyramid recommends at least six grain bread and cereal servings and at least five fruit and vegetable servings each day, which provide fiber in the diet. Foods are our best source of dietary fiber. Foods provide both soluble and insoluble fiber. In addition, food sources of fiber can be spaced out over the whole day.

#### Guidelines for Increasing Dietary Fiber

When you increase fiber in your diet, it's important to do so gradually. Increasing dietary fiber too rapidly can initially cause excess gas formation or diarrhea. Since water-insoluble fibers absorb water, it is also important to drink plenty of liquids along with increased dietary fiber intake. Include at least six, eight-ounce glasses of fluid each day. Also, try to spread high fiber foods out throughout the day, at meals and snacks. Some guidelines for increasing dietary fiber are:

- Go gradually.
- Drink plenty of water.
- Spread fiber out throughout the day.



## Fiber Content of Foods

**Rich Sources of Dietary Fiber (4 or more grams of fiber per serving)**  
(Foods with an \* have 6 or more grams of fiber per serving)

<b>Breads and Cereals</b>	*All Bran, *100% Bran or *Bran Buds	1/3 cup
	Bran Chex	1/2 cup
	Cracklin' Oat Bran	1/2 cup
	Grape-nuts	1/2 cup
<b>Legumes (cooked)</b>	*Beans, brown	1/2 cup
	*Beans, kidney	1/2 cup
	*Beans, large lima	1/2 cup
	*Beans, navy	1/2 cup
	*Beans, pinto	1/2 cup
	*Beans, white	1/2 cup
	Lentils	1/2 cup
	*Peas, black-eyed	1/2 cup
<b>Fruits and Vegetables</b>	*Artichoke, cooked	1 ea.
	Blackberries	1/2 cup
	Prunes, dried	4 ea.
	Raspberries	1/2 cup

### Moderately Rich Sources of Dietary Fiber (1 to 3 grams per serving)

<b>Breads</b>	Bagel, 3.5" diameter	1 each
	Bread, cracked wheat	1 slice
	Bread, whole wheat	1 slice
	Bread, pumpernickel	1 slice
	Bread, rye	1 slice
	Corn bread	2" square
	Crackers, whole wheat	4 each
	Muffin, bran, blueberry, cornmeal	1 each
	Muffin, English	1 each
<b>Cereals</b>	Bran, rice or wheat	2 tbs.
	Bran flakes, 40%	1/2 cup
	Corn bran cereal	1/2 cup
	Fruitful bran cereal	1/2 cup
	Grape-nuts	1/4 cup
	Grape-nut flakes	1/2 cup

### Moderately Rich Sources of Dietary Fiber (1 to 3 grams per serving) (continued)

	Granola-type cereals	1/4 cup
	Nutri-grain cereal	1/2 cup
	Oatmeal, cooked	1/2 cup
	Puffed wheat	1/2 cup
	Raisin bran	1/2 cup
	Ralston, cooked	1/2 cup
	Rice, brown, cooked	1/2 cup
	Shredded wheat	2/3 cup
	Total cereal	1/2 cup
	Wheaties	1/2 cup
	Wheat germ	2 tbs.
<b>Fruits</b>	Apple, 2 3/4" diameter	1 each
	Applesauce	1/2 cup
	Apricots, canned	1/2 cup
	Banana	1 each
	Cherries, canned or fresh	1/2 cup
	Cranberries, fresh	1/2 cup
	Dates, whole	3 each
	Figs, fresh, medium	2 each
	Fruit cocktail, canned	1/2 cup
	Grapefruit	1 half
	Kiwi fruit	1 each
	Orange, 2 5/8" diameter	1 each
	Peaches, canned	1/2 cup
	Peaches, fresh	1 each
	Pears, canned	1/2 cup
	Pears, fresh	1/2 each
	Plum, medium, 2 1/8" dia.	1 each
	Raisins	1/4 cup
	Strawberries, fresh	1/2 cup
	Tangerine	1 each
<b>Vegetables</b>	Bean sprouts, raw	1/2 cup
	Beets, diced, canned	1/2 cup
	Broccoli, chopped, frozen, boiled	1/2 cup
	Brussels sprouts	1/2 cup
	Cabbage cooked	1/2 cup
	Carrots	1/2 cup
	Cauliflower	1/2 cup
	Corn	1/2 cup
	Eggplant	1/2 cup
	Kale, boiled	1/2 cup

**Moderately Rich Sources of Dietary Fiber**  
(1 to 3 grams per serving) (continued)

	Okra, frozen, boiled	1/2 cup
	Potatoes, baked or mashed	1/2 cup
	Spinach	1/2 cup
	Squash, winter or summer	1/2 cup
	Sweet potatoes	1/2 cup
	Tomatoes, canned	1/2 cup
	Turnip greens	1/2 cup
	Yams	1/2 cup
	Zucchini, cooked	1/2 cup
Misc.	Almonds	2 tbls.
	Flour, whole wheat	2 tbls.
	Peanuts	2 tbls.
	Popcorn, popped	1 cup

**Low Sources of Dietary Fiber**

Breads	Bread, pita	1 each
and Cereals	Bread, raisin	1 each
	Bread, white	1 each
	Corn flakes	1 cup
	Crackers, saltine	4 each
	Crackers, trisket	4 each
	Crackers, graham	2 each
	Product 19	1 cup
	Rice, white	1/2 cup
	Roll, white dinner	1 each
	Special K cereal	1 cup

**Low Sources of Dietary Fiber (continued)**

Fruits	Cantaloupe	1/6 each
	Grapes, Thompson seedless	1/2 cup
	Juices, grape, orange, etc.	1/2 cup
	Mandarin oranges	1/2 cup
	Watermelon	1 cup
Vegetables	Asparagus, cooked	3 spears
	Beans, green	1/2 cup
	Chestnuts, water	1/2 cup
	Lettuce, iceberg, chopped	1 cup
	Mushrooms, canned	1/2 cup
	Mustard greens, fresh	1/2 cup
	Onions, chopped, raw	1/4 cup
	Pepper, sweet green	1/2 cup
Misc.	Flour, white	2 tbls.

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## **The Oklahoma Cooperative Extension Service**

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The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; home economics; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and based on factual information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Samuel E. Curl, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of \$559.61 for 6,000 copies. #4359 0599 CC Revised.